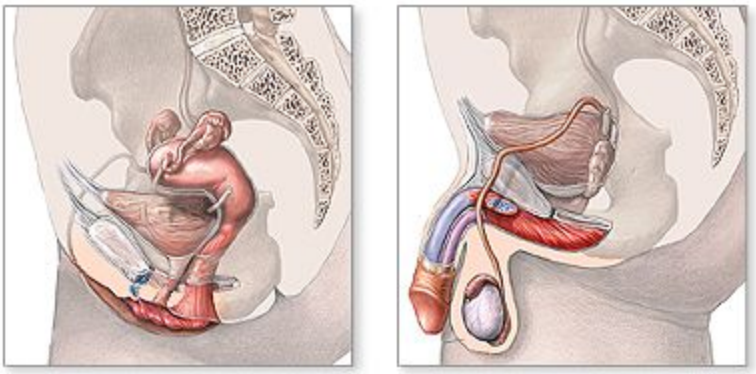
Lectures Summary

Microbiology 435's Teamwork
Reproductive Block



إِنَّا كُلَّ شَيْءٍ خَلَقْنَاهُ بِقَدَرٍ ﴿٤٩﴾

Extra summaries + Microbiology flashcards. Click here. (highly recommended)

- **Lectures summary:**
  Lecture summary **4 & 5** were revised by Dr. Mona and should be enough if you're running out of time.

Important
Males notes
Females notes
Extra

Revised by
خولة العماري & هشام الغفيلي

Resources:
435 team & lectures.
Editing file: Here
Credit: Team members

L1: SUMMARY OF VAGINITIS

- Vulvovaginitis, vulvitis, and vaginitis→Are general terms that refer to the inflammation of the vagina and/or vulva.
  - **Normal flora of vagina**→ *Lactobacilli* predominance.
  - **Predisposing factors:** Changes in the vaginal acidity or normal bacteria may predispose to an infection. As in pregnancy, DM, Immunocompromised conditions, antibiotics…

- Causes of vulvovaginitis:

	Bacterial vaginosis (40%)	**Candida** vulvovaginitis (25%)	**Trichomoniasis** (25%)
Clinical Features	- **minimal** Itching and burning - **no** Pruritus & inflammation - **rare** Dyspareunia & Dysuria	-Irritation, pruritus, soreness. - satellite lesions & erythema -Dyspareunia & Dysuria	-may be **asymptomatic**. -Pruritus, strawberry cervix -Dyspareunia & Dysuria
Etiology	*Gardnerella vaginalis* *Mycoplasma hominis.* *Bacteroides species* *Mobiluncus species.* *Prevotella species.*	*Candida albicans* 80-90%. *C. Glabrata.* *C. tropicalis*	*Trichomonas vaginalis* -Sexually transmitted parasite -The most prevalent non-viral sexually transmitted disease (STD) agent.
Vaginal discharge	-Thin, **Milky** (white or grey) - Malodorous **Fishy smelling**: (specially **after** sexual intercourse and menses).	- Thick, curdy, white (like cottage cheese) - Odorless	-Purulent **yellow** **-green** to gray, sometimes **frothy.** -Malodorous smelling
Diagnosis	***Gram Stain → Gold Standard** * **3 out of 4** of these criteria: 1. PH greater than **4.5** 2.**Fishy odor.**(+ve Whiff test) 3.Any **clue cells** in Wet Mount 4.Homogenous discharge - Culture is not helpful.	-Wet prep to **see clumps of pseudohyphae**. or Budding yeast and no pseudohyphae in patients with ***C glabrata***. -KOH prep helpful but not always necessary. -pH <4.5 (=normal)	***Culture → gold standard** Its disadvantages include cost & prolonged time before diagnosis. - pH > 4.5 **Note: wet mount & culture** (yeast +Trichomonas) = diagnose vaginitis
Treatment	**-Metronidazole,** Tinidazole -Clindamycin is less effective -Topical: higher recurrence rate	-Oral azoles (Fluconazole, Itraconazole) -Topical azoles and nystatin	- **Metronidazole.** - Alternative Tinidazole.Trea sexual partners

L2: SUMMARY OF TRANSPLACENTAL INFECTIONS

Notes: All are mostly asymptomatic, All viruses have Icosahedral capsid, toxoplasma is zoonotic,
In neonates, Serology by detecting IgM(-ve doesn't exclude), or persistent IgG > 12 months
In transmission, we mentioned routes other than transplacental route (for all)

Common Findings: Chorioretinitis, **growth & mental** retardation, Hepatosplenomegaly, Thrombocytopenia, Microcephaly, risk of intrauterine death(highest in 1st trimester/primary inf.)

	Toxoplasma Gondii	Parvovirus B19	Varicella Zoster Virus (VZV)	Rubella Virus	Cytomegalovirus (CMV)
Morphology	intracellular parasite	Parvoviridae, **non-enveloped**, **ssDNA**.	Herpesviridae dsDNA, Enveloped,	Togaviridae ss**R**NA, Enveloped	Herpesviridae dsDNA, Enveloped
Route	Ingestion of cyst/ oocyst, Blood	Respiratory Blood	Respiratory	Respiratory	Saliva, sexual, Blood, & Vertically
Congenital inf.	**The classic triad of symptoms:** Chorioretinitis, **Hydro**cephalus & Intracranial calcifications	Hydrops fetalis (**anaemia, CHF, oedema & fetal death)**	Scarring of skin Hypoplasia of limbs CNS & eye defects	Deafness, Cataracts, glaucoma, patent ductus arteriosus, **CNS**, "blueberry muffin" lesions	Ventriculomegaly, **periventricular** calcification, deafness,pneumonitis, myocarditis, "blueberry muffin"
Acquired inf.		Erythema infectiosum	Varicella (Chickenpox) Zoster (Shingle)	Maculopapular rash (German measles)	
Maternal investi.	IgM, IgG, IgG avidity, and IgG seroconversion	IgM, IgG seroconversion.	IgM, Culture (vesicular fluid), IF (Ag in cells), PCR	**IgM, IgG seroconversion**	IgM, IgG, IgG avidity
Prenatal	PCR, Culture or US	PCR, US	PCR, US, IgM (fetal blood)	PCR , Culture or US	**PCR**, culture, US, Ig**M**,
Postnatal	IgM, IgG , PCR, Culture,Evaluation		IgM , Culture, PCR	IgM, IgG, PCR, Culture	**PCR**, culture, histo (owl's eye), Ig**M**,
Treatment	Spiramycin **Pyrimethamine + sulfadiazine.**	Intrauterine blood transfusion	**Acyclovir**		Ganciclovir only if symptomatic
Prevention	Preventive measures	Preventive measures	**Preexposure:** live-attenuated vaccines **Postexposure: Ig for pregnants,** Infants	**screening for** Ig**G**. **vaccination :** for Non immunised **women +** avoid pregnancy for **3 months.**	Preventive measures

L3: SUMMARY OF STDs (Chlamydia, syphilis & gonorrhea

	Chlamydia	Gonorrhea	Syphilis
Definition	**Intracellular** replication, forming inclusion bodies Genital infection is caused by *C. trachomatis (D-K)*	Caused by N. gonorrhoeae. Acquired by direct genital contact. It is localized to mucosal surfaces.	chronic systemic infection, caused by Treponema pallidum subsp. pallidum
Epidemiology	Spread by genital secretions, anal or oral sex Wide spread	Inability to detect asymptomatic cases & patient fail to seek medical care hampers control .	Transmission by contact with mucosal surfaces or blood, or transplacental
Pathogenesis	proinflammatory cytokines → infiltration by inflammatory cells → necrosis, fibrosis	localized in epithelium→ inflammation. Posses pili and outer membrane proteins that mediate attachment to non ciliated epithelium.	Bacteria access→multiplication→ **endarteritis & granulomas** → **Ulcer heals but spirochete disseminate** →Latent periods due to surface binding of host components. **Injury due DTH & spirochetes.**
Clinical manifestations	Men: NGU & epididymitis Women: Cervicitis (asymptomatic 50-70%), salpingitis, urethral syndrome & endometritis Both:proctitis. Infants: inclusion conjunctivitis, 5-10% infant pneumonia syndrome.	Men: acute urethritis with profuse purulent urethral discharge. Women: mucopurulent cervicitis, urethral discharge, PID (pain and fever), if it spreads by blood= DGI (fever, rash and arthritis) Both: urethritis, Proctitis, Pharyngitis may occur	**Primary**: Chancre (painless) **Secondary**: rash, nail track ulcers, Bacteremia, Condylomata Lata *Primary and secondary are infectious* **Latent**: no symptom but infection evident by serologic tests **Tertiary:** (not infectious) 1-Neurosyphilis: chronic meningitis, demyelinating & PARESIS 2-Cardiovascular Syphilis: Arteritis → aneurysm 3- others: "gumma" local destruction
Diagnosis	1- PCR or LCR: the most sensitive methods 2- culture (McCoy cell line) but it is *rarely done: C.trachomatis* **inclusions** can be seen by iodine or Giemsa stained smear	1-Gram stain → G-ve diplococci (intracellular) 2-Culture on Thayer-Martin 3-fermentation of glucose **only** or Coagglutination test.	1. Dark field **microscopy** 2. **Serological (mainly):** **A-Nontreponemal tests:** RPR & VDRL (screening & follow up) **B- Treponemal tests:** FTA-ABS & MHA-TP(confirmation) **C- IgM:** used in congenital syphilis.
Treatment	1-Azithromycin non-LGV 2- Erythromycin for pregnant 3-Doxycycline for LGV.	1-Ceftriaxone or Cefixime 2-Ciprofloxacin or Ofloxacin 3-Azithromycin or Doxycycline if co-infected with C.trachomatis	- **Penicillin** **-if allergic**: *Tetracycline, Erythromycin or Cephalosporin*.

L3: Another SUMMARY

1. Chlamydia	
Definition	• Intracellular, no rigid cell wall Fail to grow on artificial media • Uses host cell metabolism for growth and replication forming inclusion bodies.
Epidemiology	• Spread by genital secretions, anal or oral sex & Human are the sole reservoir . • 1/3 male sexual contacts of women with C.trachomatis cervicitis → urethritis after IP 2-6w.
Pathogenesis	• tropism for specific epithelial cells → cause infection on specific sites in women & men • proinflammatory cytokines→ infiltration by inflammatory cells→necrosis, fibrosis & scarring.
Genital infections	• men: NGU urethritis & epididymitis • women: Cervicitis (asymptomatic 50-70%), salpingitis, urethral syndrome & endometritis • Both: proctitis. • infants: 50% inclusion conjunctivitis, 5-10% infant pneumonia syndrome.
Diagnosis	• (PCR)or(LCR) the most sensitive methods Done on vaginal, cervical, urethral swabs, or urine • Isolation on tissue culture (McCoy cell line) but it is *rarely done*. *C.trachomatis* inclusions can be seen by iodine or Giemsa stained smear.
Treatment	• Azithromycin single dose for non- LGV infection. • Erythromycin for pregnant women. • Doxycycline for LGV.
Prevention	early detection of asymptomatic cases, screening → decrease transmission

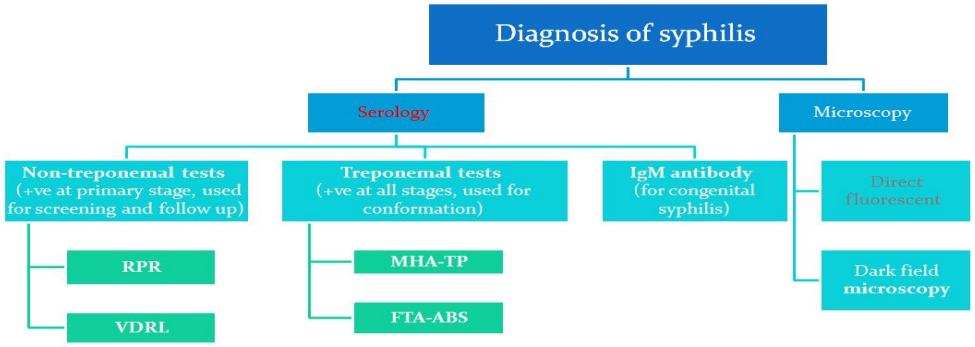
2. Gonorrhea	
Definition	• N.gonorrhoeae acquired by direct genital contact. It is localized to mucosal surfaces
Epidemiology	• Inability to detect asymptomatic cases & patient fail to seek medical care hampers control . • Major reservoir are **asymptomatic cases.** • Non-sexual transmission is rare.
Pathogenesis	• mainly localized in epithelium but Not a normal flora, leads to intense inflammation. • Gram - diplococci. It grows on chocolate agar and selective enriched media and CO2 required. • Posses pili and outer membrane proteins that mediate attachment to non-ciliated epithelium. • Invasion by **IA** and **Opa** proteins.

Clinical manifestations	• 2-5 days IP → Symptoms (which are similar to Chlamydia infection). • Men: acute profuse purulent urethral discharge. • women: mucopurulent cervicitis, urethral discharge., (PID) • both: urethritis, Proctitis, Pharyngitis may occur
Diagnosis	• **Transport media required unless transfer to the lab is immediate.** • Gram stain → Gram - diplococci within a neutrophil (intracellular), more sensitive in men . • Culture on Thayer-Martin or other **selective medium.** • Isolates identified by sugar fermentation of glucose only or Coagglutination test.

Treatment	• Partner should be treated as well.
	• Treatment is guided by local resistance pattern and susceptibility testing.
	  ○ Ceftriaxone IM (or oral Cefixime recommended).
	  ○ Ciprofloxacin or Ofloxacin
	  ○ Azithromycin, Doxycycline (orally 7 days), both cover C.trachomatis infection as well

3. Syphilis

Definition	• chronic systemic infection, STD, caused by Treponema pallidum subsp.pallidum
Features	• grow on cultured mammalian cells **only** • NOT stained by Gram stain, • seen by (IF), dark field microscopy or silver impregnation histology technique.
Epidemiology	• Transmission by contact with mucosal surfaces or blood, or transplacental • **Early disease is infectious,** Late is not.
stages	• **Primary**: (IP 2-6w) →Chancre heals spontaneously (after 4-6 w) Enlarged inguinal lymph nodes may persist for months. • **Secondary**: 2-8 weeks after primary lesion healed: symmetric mucocutaneous rash, snail track ulcers, generalized non-tender lymph nodes enlargement (full of spirochete), bacteremia causing fever, malaise and other systemic Manifestations, 1/3 develop Condylomata Lata. • **Latent**: Secondary resolve (after few days-many weeks) disease continue in 1/3 of patients. & enter into a latent state (no clinical manifestations but infection evident by serologic tests) Relapse cease & risk of blood-borne transmission from relapsing mother to fetus continue which Lead to Congenital syphilis: fetus is susceptible to acquire syphilis after 4th month of gestation. Leading to : Fetal loss or Congenital syphilis: Rhinitis, rash, bone changes (saddle nose, saber shine), anemia, thrombocytopenia, and liver failure. • **Tertiary** : 1/3 of untreated cases. Manifestations may appear after 15-20 years or may be asymptomatic but serological tests positive. Can cause : 1-Neurosyphilis: chronic meningitis, with increased cells and protein in CSF, leads to degenerative changes and

	psychosis, Demylination causes peripheral neuropathies. Most advanced cases result in paresis (personality, affect , reflexes, eyes, senorium, intellect, speech) due to the effect on the brain parenchyma and posterior columns of spinal cord and dorsal roots. 2-Cardiovascular Syphilis: Arteritis , which leads to aneurysm of aorta and aortic valve ring & Localized granulomatous reaction called gumma on skin, bones, joints, other organs →local destruction
Pathogenesis	• Bacteria access through inapparent skin or mucosal breaks. • Slow multiplication produces **endarteritis** & **granulomas**. • **Ulcer heals but spirochete disseminate.** • Latent periods may be due to surface binding of host components. • **Injury is due to DTH to the persistence of the spirochetes.**
Diagnosis	 1. Dark field **microscopy** of smear from primary or secondary lesions. May be negative. 2. **Serologic** tests: more commonly used as they are easier to perform. Include: **1-Nontreponemal tests**: antibody to cardiolipin (a lipid complex extracted from beef heart), this Ab. is called "**reagin". The tests are:** • rapid plasma reagin (**RPR**) • venereal disease research laboratory (**VDRL**). Become positive during the primary stage (possible exception: HIV), antibody peak in secondary syphilis, then slowly wane in later stages. Used for **screening** and **follow up**. **2- Treponemal tests**: using treponemal antigen to detect specific antibody to T.pallidum by : A- Fluorescent Treponemal Antibody (**FTA-ABS**) . B- Microhemagglutination test (**MHA-TP**) (antigen attached to erythrocytes) **Positive results of treponemal test confirm RPR and VDRL.** **3- IgM** used to diagnose congenital syphilis.
Treatment	• **Penicillin,** hypersensitive patients with *Tetracycline, Erythromycin or Cephalosporin*.

L4: SUMMARY OF HIV

HIV		
intro		• HIV is known to infect mainly T-helper cells (CD4) • Destroying T-helper cells (CD4) leading to multiple opportunistic infections, unusual cancers and death.(seen in the end stage 'AIDS')
Morphology		• Two copies of **ss**-RNA. • Enzymes:مهم جدا جدا كل انزيم نعرف وش تعمل ○ Reverse transcriptase: converts viral RNA into DNA. ○ Integrase: integrates viral DNA with host DNA (provirus), persisting infection. مهم كتير ○ Protease: viral protein maturation.
types		**HIV-1:** worldwide, ↑ virulent & ↑ susceptible to mutation. **HIV-2:** in specific regions, ↓ virulent & ↓ susceptible to mutation.
transmission		• **Sexually** (the most common route) • **Parenterally:** through **DIRECT** exposure to infected blood *(needles, contaminated surgical and dental instruments).* • **From mother to child:** transplacentally, during delivery (most common) & breastfeeding.
course	**Acute phase**	• High viral load. Pt mostly asymptomatic or have flu like syndrome • **Diagnosed by:** PCR to detect viral load
	Chronic phase	• Asymptomatic but contagious. • Diagnosis mainly by ELISA, Western Blot. • CD4 count > 500/ml. • **at the end of this stage patients start to develop:** 1) **Persistent generalized lymphadenopathy:** Enlargement of lymph nodes In **two** or more **EXTRA** inguinal area. (CD4 count decreased but still more than 200 cells) MCQ 2) **AIDS-related complex:** occur before AIDS characterized by Weight loss(Slim disease) (CD4 count decreased but still more than 200 cells).
	AIDS	• The end stage of the disease. CD4 cell count < 200 (marked ↓). **They suffer from:** 1) multiple opportunistic infections e.g Pneumocystis pneumonia ,toxoplasmosis, extra pulmonary myco-baceriosis . 2) Development of unusual cancer(Kaposi sarcoma)
diagnosis		• **Pt history** للاسف اغلبهم مايقولوا الحقيقة☹ 1) Screening patient's serum by ELISA for both (HIV Ag p24 & HIV Ab)بس اعرفوها اسماء • if the result is +ve we repeated the specimen twice in duplicate • if still giving +ve result will do confirmatory tests (Western Blot)MCQ 2) **Confirming:** Western Blot, Riba, PCR • Blood viral load by PCR is important. to diagnose acute phase, infant & also used as confirmatory test and to follow up patients response to treatment.
treatment		• Is a combined therapy known as high active antiretroviral therapy (HAART), usually composed of **two** reverse transcriptase inhibitors and **one** protease inhibitor(very very imp). • NOTE: HAART does not clear the virus (MCQ),
prevention		• There is no vaccine available yet for HIV

L5: SUMMARY OF HSV & HPV

Genital Herpes and genital Warts are recognized as the main sexual transmitted viral infections that might be acquired by any types of sexual contact. Both are DNA viruses

HSV	HPV
There are **two species** of herpes virus capable of causing genital herpes: **HSV-2 (90%)** and HSV-1 (10%) **Characteristics Of Herpes Virus:** - Linear ds-DNA. - induce latent infection, HSV (1&2) → NERVE CELLS. (HSV-1→ Trigeminal ganglia, HSV-2→ Sacral ganglia)	**Characteristics Of HPV:** - Circular ds-DNA. - They cause disease only in skin and mucous membrane. - Does not grow in tissue culture.
Transmission of Genital HSV infection - **Sexual transmission**: people with multiple sextual partners, Homosexual men, auto-inoculation, oral sex & in cases of child abuse. - **Perinatal transmission (during delivery)** : → To avoid perinatal infection we do **Caesarean section**. - **Intrauterine(vertical) transmission (10%)** : primary in **1st** trimester→ abortion | after 1st trimester→ malformation	Types of warts and HPV genotype 1. Cutaneous warts 2. Ano-genital or mucosal: *Condyloma acuminata (benign HPV 6,11). *Cervical carcinoma (HPV 16,18, 31,45). *Penile and anal carcinoma (HPV 16,18) in men. *Laryngeal Warts (benign HPV 6,11)→ during delivery.
Clinical features of HSV-2 infection: **1- Primary genital infection:** Vary from asymptomatic to mild or severe painful episode. - **Herpes causes vesicular regions on the external genitalia in men and women (mainly caused by HSV-2)** - Pain, itching, burning, discharge from penis or vagina, fever, dysuria, Inguinal lymphadenopathy, vesicle, meningitis. 2- **Neonatal herpes infection** : it has three forms - Localized skin infection. - Localized brain infection. - Generalized Neonatal herpes infection → pneumonia, encephalitis, & hepatosplenomegaly. usually fatal 3- **Recurrent genital herpes**: - Occurs after reactivation by any condition decreased the immunity	**Link between HPV and cervical cancer**: (important) - HPV type 6 and 11 (Condylomata acuminata) → more to be benign. unusual to become malignant but it can - HPV 16 and 18→ malignant & high chance of progression to metastasizing. - Persistent HPV infection is considered the main cause of cervical cancer - > 90% of positive Pap-smear is due to HPV infection.
Lab diagnosis: - ELISA→ detection of IgM Ab. - Immunofluorescence (IF) → detection of the Ag. - PCR → CSF sample in case of neonatal herpes. - Tissue culture	**Lab diagnosis** : - PCR → gold standard - Pap-smear test
Management: - **No vaccine is available** **Treatment:** Acyclovir	**HPV prevention** There are **two vaccines available** - Gardasil → against genotypes 6,11,16,18 Cervarix→ against genotypes 16, and 18